Amendments to the Claims

1-13 (canceled)

14. (new) A method for identifying substrates which will affect survival, proliferation, or differentiation of stem cells or undifferentiated cells, which method comprises the steps of culturing such cells upon a combinatorial substrate having a pattern of discrete surface regions varying in microstructure or surface composition, and following a period of time of culture, examining the cultured cells on said combinatorial substrate to determine the extent of adhesion and/or change in said cultured cells across said discrete surface regions.

15. (new) The method of claim 14 wherein stem cells are cultured and said examining step is carried out to identify stem cells that have differentiated into specific lineages as a result of being cultured in contact with different discrete surface regions of the substrate.

16. (new) The method of claim 14 wherein said discrete regions are coated with bioactive molecules selected from the group consisting of growth factors, extracellular matrix molecules, and cytokines.

17. (new) The method of claim 14 wherein said discrete regions vary in microstructure.

18. (new) The method of claim 17 wherein said surface regions comprise a polymer or polymer blend coating.

19. (new) The method of claim 18 wherein the polymer or polymer blend is biodegradable.

20. (new) The method of claim 14 wherein said examining step includes detecting for the presence of a marker on said cultured cells.

21. (new) The method of claim 20 wherein said examining step comprises staining said cultured cells and using fluorescent imaging to identify discrete surface regions which induced preferred properties in the cells cultured thereupon.

22. (new) A combinatorial substrate designed to determine the effect of different microdomains on stem cells or other undifferentiated cells that are cultured thereupon, which substrate comprises a distinct pattern of discrete regions that vary in surface composition as a result of which variance cells cultured thereupon will respond differently, and a layer of stem cells which have been in culture thereupon for a period of days which cultured cells have differentiated to cells of different lineage so as to afford analysis of the effect of different surface compositions of different microdomains upon such cells being cultured.

23. (new) The combinatorial substrate of claim 22 wherein said discrete surface regions vary in microstructure.

24. (new) The combinatorial substrate of claim 23 wherein the microdomains vary in surface roughness.

25. (new) The combinatorial substrate of claim 24 wherein the microdomains vary in surface roughness over a range of about 0.1 μm to about 60 μm.

26. (new) The combinatorial substrate of claim 23 wherein the substrate is a coating of a polymer or polymer blend.

27. (new) The combinatorial substrate of claim 26 wherein said coating is a polymer blend of poly(D,L-lactide) and poly(ε-caprolactone).

28. (new) The combinatorial substrate of claim 26 wherein the polymer or polymer blend is biodegradable.

29. (new) A method for identifying substrates which will affect adhesion, survival, proliferation, or differentiation of stem cells, undifferentiated cells, progenitor cells or endothelial progenitor cells, which method comprises the steps of culturing such cells upon a combinatorial substrate having a pattern of discrete surface regions varying in microstructure

and/or chemistry, and following a period of time in culture, examining the cultured cells on said combinatorial substrate to determine the extent of adhesion and/or change in said cultured cells across said discrete surface regions.

30. (new) The method of claim 29 wherein said cells are stem cells and wherein the composition of said surface regions is such to cause differentiation to endothelial cells.

31. (new) The method of claim 30 wherein the discrete surface regions vary in microstructure and comprise a polymer or polymer blend coating.

32. (new) The method of claim 30 wherein said discrete regions are coated with bioactive molecules selected from the group consisting of growth factors, extracellular matrix molecules, and cytokines.

33. (new) The method of claim 30 wherein said examining step includes the step of detecting for a marker to identify discrete surface regions which induced preferred properties in the cells cultured thereupon.